

16D of tab 16C is further bent and is attached onto upper surface 1A of substrate 1 with adhesive layer 17A, thus providing touch panel 1001 shown in FIG. 1.

[0034] Touch panel 1001 in accordance with Embodiment 1 includes spacer 1 which has substantially the frame shape and has opening 15C therein, and spacer 15 couples substrate 1 to substrate 2. When sheet 16 is attached onto lower surface 2B of substrate 2, the air can enter and exhaust through opening 15C as to prevent substrate 2 from swelling, thereby allowing sheet 16 to be attached onto substrate 2 without air bubbles. After sheet 16 is attached onto substrate 2, opening 15C is closed with tab 16C, thereby preventing dust and moisture from entering into a space between substrates 1 and 2. As a result, an operator activates touch panel 1001 stably. Adhesive layer 17B and removable sheet 18 may have tabs protruding outward.

[0035] Removable sheet 18 is peeled off, and then, lower surface 16B of sheet 16 of touch panel 1001 is attached onto display element 101, thus allowing touch panel 1001 to be mounted to an electronic device. Electrodes 32A, 32B, 33A, and 33B are connected to an electronic circuit of the electronic device.

[0036] While looking at display of display screen 101A of display element 101 through touch panel 1001, an operator presses upper surface 1A of substrate 1 with a finger or a pen to cause substrate 1 to sag, accordingly causing resistance layer 3 to contact resistance layer 4 at a pressed portion of the substrate. The electronic circuit applies a voltage between electrodes 32A and 32B, and detects a voltage of electrode 33A or electrode 33B. The electronic circuit calculates the pressed position along direction 1001A based on the detected voltage. Then, the circuit applies a voltage between electrodes 33A and 33B, and detects a voltage of electrode 32A or 32B. The circuit calculates the pressed position along direction 1001B based on the detected voltage. Thus, the circuit calculates the respective positions of the pressed portion in directions 1001A and 1001B, so that the electronic circuit switches various functions of the electronic device in response to the calculated position.

[0037] Touch panel 1001 may be attached onto display element 101 with misalignment due to a positional deviation. In touch panel 1001, adhesive layer 17A on upper surface 16A of sheet 16 has the strong adhesion property, and adhesive layer 17B on lower surface 16B has the adhesion property weaker than that of adhesive layer 17A. When touch panel 1001 is removed from display element 101 just after being attached onto display element 101, sheet 16 is not removed from substrate 2, so that touch panel 1001 can be mounted onto display element 101 again.

[0038] FIG. 4 is a sectional view of another touch panel 1002 in accordance with Embodiment 1. In FIG. 4, components similar to those of touch panel 1001 shown in FIG. 1 are denoted by the same reference numerals, and their descriptions are omitted. Sheet 16 is attached onto upper surface 1A of substrate 1 with adhesive layer 17A. Sheet 16A protects upper surface 1A serving as an operating surface. Sheet 16 of touch panel 1002 has tab 16C, and tab 16C is bent downward as to cover and close opening 15C of spacer 15.

[0039] FIG. 5 is a sectional view of still another touch panel 1003 in accordance with Embodiment 1. In FIG. 5,

components similar to those of touch panel 1001 shown in FIG. 1 are denoted by the same reference numerals, and their descriptions are omitted. Touch panel 1003 further includes polarizing plate 51 on upper surface 1A of substrate 1. Polarizing plate 51 includes a layer of polyvinyl alcohol and layers of triacetyl cellulose on both surfaces of the layer of polyvinyl alcohol. The layer of polyvinyl alcohol is formed by adsorbing iodine and dye and then drawing and providing the layer with orientation. Polarizing plate 51 has a linear polarization property.

[0040] FIG. 6 is a sectional view of a further touch panel 1004 in accordance with Embodiment 1. In FIG. 6, components similar to those of touch panel 1003 shown in FIG. 5 are denoted by the same reference numerals, and their descriptions are omitted. Touch panel 1004 further includes phase shifter plate 52 placed between polarizing plate 51 and substrate 1. Phase shifter plate 52 is provided on upper surface 1A of substrate 1, and polarizing plate 51 is provided on upper surface 52A of phase shifter plate 52. Phase shifter plate 52 is made of polycarbonate or cyclo-olefin polymer film being drawn and having a birefringence property. Phase shifter plate 52 produces a phase shifting by a $\frac{1}{4}$ wavelength. Touch panel 1004 includes sheet 116 instead of sheet 16 shown in FIG. 5. Sheet 116 has a shape similar to that of sheet 16, and is made of material identical to that of phase shifter plate 52. Sheet 116 and phase shifter plate 52 together function as a circularly-polarizing plate. Sheet 116 has tab 116C protruding outward similarly to sheet 16 shown in FIG. 5. Tab 116C is bent upward to cover and close opening 15C of spacer 15. Tip 116D of tab 116C is attached onto upper surface 51A of polarizing plate 51.

[0041] FIG. 7 shows a sectional view of further touch panel 1005 in accordance with Embodiment 1. In FIG. 7, components similar to those of touch panel 1002 shown in FIG. 4 are denoted by the same reference numerals, and their descriptions are omitted. Touch panel 1005 further includes phase shifter plate 152 provided on lower surface 2B of substrate 2. Plate 152 is made of polycarbonate or cyclo-olefin polymer film being drawn and having a birefringence property. Phase shifter plate 152 produces a phase shifting by a $\frac{1}{4}$ wavelength. Touch panel 1005 includes sheet 216 instead of sheet 16 of touch panel 1002 shown in FIG. 4. Sheet 216 has a shape similar to that of sheet 16, and is made of material identical to that of phase shifter plate 152. Touch panel 1005 further includes polarizing plate 151 provided on upper surface 216A of sheet 216. Polarizing plate 151 includes a layer of polyvinyl alcohol and layers of triacetyl cellulose on both surfaces of the layer of polyvinyl alcohol. The layer of polyvinyl alcohol is formed by adsorbing iodine and dye and then drawing and providing the layer with orientation. Polarizing plate 151 has a linear polarization property. Sheet 216 and phase shifter plate 152 together function as a circularly-polarizing plate. Sheet 216 has tab 216C protruding outward as sheet 16 shown in FIG. 5 has. Tab 216C is bent upward to cover and close opening 15C of spacer 15. Tip 216D of tab 216C is attached onto lower surface 152B of polarizing plate 152.

Exemplary Embodiment 2

[0042] FIG. 8A is a sectional view of touch panel 2001 in accordance with Exemplary Embodiment 2 of the present invention. FIG. 8B is an exploded view of touch panel 2001. Touch panel 2001 includes substrate 501, substrate 502,